

## Epitaxial and Polycrystalline Growth of $\text{Si}_{1-x-y}\text{Ge}_x\text{C}_y$ and $\text{Si}_{1-y}\text{C}_y$ Alloy Layers on Si by UHV-CVD

### Abstract of the Invention

A method and apparatus for depositing single crystal, epitaxial films of silicon carbon and silicon germanium carbon on a plurality of substrates in a hot wall, isothermal UHV-CVD system is described. In particular, a multiple wafer low temperature growth technique in the range from 350°C to 750°C is described for incorporating carbon epitaxially in Si and SiGe films with very abrupt and well defined junctions, but without any associated oxygen background contamination. Preferably, these epitaxial SiC and SiGeC films are in-situ doped p- or n-type and with the presence of low concentration of carbon  $< 10^{20} \text{ cm}^{-3}$ , the as-grown p- or n-type dopant profile can withstand furnace anneals to temperatures of 850°C and rapid thermal anneal temperatures to 1000°C.